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THE

# PHTHALMIC REVIEW

*A MONTHLY RECORD OF OPHTHALMIC SCIENCE*

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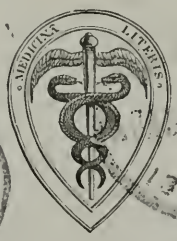

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# CONTENTS.


ORIGINAL— PAGE

ERNEST F. MADDOX. *The Prescribing of Prisms* . . 37

REVIEW—

E. EMMERT. *Keratitis Dendritica and Herpes Corneæ Febrilis* . . . . . 46

LANGLEY AND ANDERSON. *On the Mechanism of Movements of the Iris.* . . . . . 50

E. FUCHS. *Text-book of Ophthalmology, Translation from Second German Edition* . . . . . 55

E. LANDOLT. *Cataract Operation in our Time* . . . 56

A. ELSCHNIG. *On the Origin of Retinal Rupture in Retinal Detachments* . . . . . 58

OPHTHALMOLOGICAL SOCIETY, JANUARY 26, 1893. *Remarks on Peculiar Foreign Bodies on the Cornea—Simple Photophobia treated by the Continuous Current—Concerning Persistent Pupillary Membrane and its Frequency—Living and Card Specimens* . . . . 62

AMERICAN OPHTHALMOLOGICAL SOCIETY, TWENTY-EIGHTH ANNUAL MEETING. *Tenotomies of Recti Muscles for Insufficiencies—Intra-cranial Lesions with Defects of the Visual Fields—Monocular Amblyopia in Members of the same Family—Posterior Capsular Opacities—Orbital Cellulitis—Tenonitis—Subconjunctival Application of Cocaine—Form of Images in Astigmatic Eyes.* . . . . . 65



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# THE PRESCRIBING OF PRISMS.

By Ernest F. Maddox, M.D.Edin.

Much discredit is likely to be thrown upon prisms if they are prescribed too promiscuously. In their own sphere they are of great value, but outside it they will of course cause disappointment. I should be sorry to see the glass rod test so misapplied as to be considered in itself an infallible guide to prisms. It is a perfectly reliable and delicate test for one symptom, viz., the latent equilibrium of the eyes for the distance at which the test is made. Were our vision always for a distance of five metres in daily life, or for any other invariable distance, the rod test would give us the exact strength of prism which it would be advisable to wear when muscular asthenopia is complained of. But since we are concerned with vision for all distances, we have to take into account, and make a study of, the great function of convergence. We may do this by a series of three or four tests, beginning with the simplest and quickest, and dispensing with the later ones if they appear unnecessary.

The first test is the familiar one of approaching a finger towards the root of the nose till one eye diverges, fixing the patient's attention upon the finger nail all the while as strongly as we can. The test is far from a perfect one, but it is so readily made that it should never be omitted. The distance at which the effort to converge is given up indicates the near point of convergence—not so strictly as the dynamometer, but


Ophthal. Review, Vol. XII., No. 136, February, 1893.

sufficiently for our purpose. In practice, one gets into the way of judging as much by the appearance of convergence in the two eyeballs as by the distance of the finger, and this is really a good habit, for the finger may often pass far within the near point of convergence before the effort to converge is given up in sufficient measure to become apparent to an observer. It is well, therefore, to cultivate the habit of observing how much appearance of convergence we should be able to impart to normal eyes.

After approaching the finger within a certain distance one eye rotates outwards, while the other still remains directed to the finger. This is due to the abandonment of the converging effort as soon as the impossibility of converging for so close an object is realised. Though the eye which deviates has perhaps less distinct vision for the finger, it must not, of course, be supposed that the diverging eye has necessarily a weaker internal rectus than the other, nor that the test is one which estimates the strength of the internal recti. It is the function of convergence which we are testing, and that only. The result informs us as to the "near point of convergence." In normal subjects it can easily be shown that by making both eyes move to the right, or both to the left, a much greater adduction can be imparted to either eye than is possible by approaching a finger straight towards the root of the nose. Indeed, in the latter case there may be no convergence at all, while perfect movements of both eyes together to right or left are demonstrable. These simple facts are of course familiar to readers of the REVIEW, but they cannot be repeated too often, as one still sometimes hears "insufficiency of the internal recti" spoken of, instead of "insufficiency of convergence."

By combining in our minds the greatest apparent convergence in the eyeballs that we are able to produce, and the distance from them of the point at which one

eye rolls outwards, we can form a very fair estimate of the positive converging power of the individual. If the converging power is manifestly defective, we proceed to test the latent conditions of equilibrium for distant and near vision by the "rod test" or the "card test" respectively, or if these are not available, we may do the best we can with the ordinary "cover test." In this latter we should cover an eye with the hand for at least half a minute before removing the hand to notice the amount of readjusting movement that takes place in the eye when restored to vision. By carefully timed experiments I have found that in my own case an eye excluded from vision begins to deviate in less than half a second, and does not appear completely to cease deviating for half a minute. By far the largest part of the deviation, however, has taken place in from five to ten seconds, so that where a quantitative estimate is not desired a quick observation can be made. The "cover test" should be made first with the patient fixing a distant object, and then fixing a near one, such as the finger-nail at ten or twelve inches, or, as suggested by Hansen Grut, a printed letter or small piece of printed paper on the finger end. If the rod and card tests are available, the cover test can be dispensed with since it needs much more skill and gives very inferior results.

The rod test need not be again described. The best form for use is a series of small glass rods about an inch long, arranged parallel to each other, and in close contact. Anyone can make this for himself by breaking up a long glass rod of about one-eighth of an inch in diameter into short pieces of equal length, laying them side by side on a hard surface, such as a marble mantlepiece, to get them perfectly level, and then fixing their ends with sealing wax. The advantage of this form is the ease with which it is held opposite the patient's pupil, for one of the rods must be in front of it. By using this arrangement of rods even the stars

can be made to yield delicate lines, though for this purpose it is best to collect as much of their feeble light as possible by using a plano-convex cylinder with a radius of curvature of 20mm. By its means exquisitely delicate lines are produced, of great beauty. The results are practically the same as with vision for six metres. Of course stars are not clinically available, and I mention the fact for the sake of interest only.

Having made the "finger test," and the "rod test," we next proceed to make the "card test." This, too, has been described elsewhere,[1] so that much need not be said about it. At reading distance, divergence of 3° or 4° is the usual latent deviation under physiological conditions,[2] though not quite invariably so. As we look further and further away the divergence becomes less, till at 6m. it is generally inconsiderable, and in many cases it gives way to slight convergence, long before that distance has been reached. I once thought that the latter condition, *i.e.*, latent convergence in distant vision, was the rule, but my earliest experiments, by a difficult method, had to be made on too limited a number of subjects, and later investigations by the more rapid rod test, made in Mr. Berry's clinic at his request, showed that slight latent convergence at 6m. is rarer in emmetropes than slight latent divergence.

The conditions which I formerly described in *near* vision, however, (OPHTHALMIC REVIEW, vol. v., p. 341) and the gradual diminution of the near latent divergence as vision recedes, have been amply confirmed by later methods.

The "card test" can be made for use at various distances, as *e.g.*, 1m., ·5m., ·33m., or ·25m., but for practical purposes ·25m. is perhaps the most convenient distance. A card printed with a single vertical arrow, the foot of

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[1] "Ophthalmological Prisms," 1st edit., p. 86.
[2] *Journal Anat. and Phys.*, vol. xx., p. 483.

which rests on a horizontal row of figures representing degrees at the distance of the test, is obtainable.[1] It is well to fasten to the card a piece of thread .25m. long to hold it at the proper distance. It is then duplicated by a vertical prism of 12° (6° d.) before one eye, when the point of the lowest arrow will point up to the figure expressing the degree of duration.

I have generally been satisfied with the three tests, the "finger," "rod," and "card" tests, without proceeding to the fourth, which was suggested on pp. 94 and 80 of my book on Prisms, viz., the "relative range, with vision for occupation distance." By "relative range of convergence" is meant the extent to which convergence can be artificially increased or relaxed while accommodation remains the same, being maintained, as during the patient's daily occupation, for some object at a definite distance. The greatest obtainable excess of convergence constitutes the positive part of the range, and the greatest possible diminution constitutes the negative part of the range. The positive range we measure by finding the strongest adducting prism that can be worn without destroying single and distinct vision of the object looked at, and the negative range by the strongest abducting prism that will fulfil the same conditions. It is, of course, necessary to see that the object remains distinct as well as single, for it sometimes happens, especially if double revolving prisms be used, that a patient will surrender his accommodation to retain his singleness of vision, rather than surrender his singleness of vision to retain his accommodation.

I gave this test a place in my book, in an ideal investigation, only second in importance to the absolute convergence, and theoretically it is an admirable test. It takes time, however, and some intelligence in the patient, so that I would now reserve it only for unusual

[1] From Curry and Paxton, London.

and important cases. It is well to depend mostly on rapid tests, and we are then less tempted to omit them if pressed for time. Dr. Percival, however, has taken up this test and seems to prefer it to the others. I shall be glad if he can increase its usefulness, as he has endeavoured to do by seeking to establish an "area of comfort." (OPHTHALMIC REVIEW, vol. xi., p. 313). The idea is a good one and worth working out. He suggests, however, as a working hypothesis that the area of comfort corresponds to the middle third of the relative range. To put this in language which some will perhaps understand better, if the highest adducting prism compatible with single distinct vision of an object be more than twice the strength of the highest abducting prism, or *vice versa*, the "area of comfort" is transgressed, and relief will be afforded by prescribing prisms.

Dr. Percival's rule might perhaps hold good for near vision, but for distant vision it will certainly need alteration, for normal individuals overcome adducting prisms, with great ease, of more than twice the strength of the highest abducting prism they can tolerate. So that were this rule true, all these would be in discomfort. I, for instance, can only just overcome a prism of 6° (3° d.) with its base in, while I can easily overcome one of 22° (11° d.) with its base out, in negative accommodation.

I think, however, that Dr. Percival's idea of an "area of comfort" is a good one, and only needs working out more thoroughly. In practice, it is best to work on as few rules as possible, so as to take a broad view of each case. The "area of comfort," for instance, in a healthy man would be enormously greater than in a neurasthenic, and no rule could be made to hold good for both.

In prescribing prisms I would recommend the following maxims. (1) Never order them unless the indications for their use are unmistakable. (2) Never order them simply on account of an anomaly in the behaviour

of the eyes under the various tests, unless there is asthenopia, headache, tendency to diplopia, or giddiness, possibly relievable by them. (3) Do not judge by one test, but by the "finger," "rod," and "card" tests, and if specially indicated, the "relative convergence" test also. (4) Remember that considerable latent deviation in distant vision is more important than in near vision (though the latter is not to be ignored), and that moderate divergence in near vision is physiological. (5) Always more or less under-correct with prisms.

It will, I think, be evident from what I have said that the rod test was never meant to be by itself an exact guide to prescribing prisms. It contributes its own evidence well and trustily, but other evidence has to be gathered also, and every case treated on the principles of common sense, and under the guidance of an intelligent grasp of the physiology of the subject.

But while all this is true of deviations on the horizontal plane, there is a sphere in which the rod test alone *does* form a reliable indication of the strength of prism required. I refer to *vertical* deviations, for in them there is no converging function to complicate matters, and latent vertical deviations (hyperphoriæ) remain much the same in amount whatever be the distance of vision. It is true they are rare, though not so rare as they are thought to be, and their correction is often extremely satisfactory. Slight latent vertical deviations cause far more trouble than slight horizontal ones. It is desirable, when possible, to test them more than once to see if they are constant, and it is surprising how often after years have elapsed they are present to the same degree as before.

Hyperphoria may be divided into two great classes—the simple and the paretic. Simple hyperphoria is much the commoner in my experience; in it the degree of vertical deviation remains unchanged, whether the eyes are directed downwards or upwards. It answers,

in fact, to concomitant strasbismus, and it is impossible to tell whether the fault is due to a deviation of one eye upwards or of the other eye downwards. In paretic hyperphoria the latent deviation is greater in some directions than in others, and by using the rod test as described on p. 287, vol. ix. of the REVIEW, it is easy to discover which eye is at fault, and which muscle is affected.

Paretic cases are not so suitable for prisms, for they tend to recovery of themselves, though sometimes partial correction by temporary prisms may give satisfaction for a time.

The *highest* degree of hyperphoria I have seen was 10° in a young man in robust health, about to leave school. He had no headache with it, perhaps accounted for by the fact that he had not only had it from infancy, as evidenced by the occasional rolling up of one eye, but also that his grandmother was liable at times to a rolling up of the eye of the corresponding side. With hereditary transmission of the defect there was also probably transmitted a toleration of the same.

The *smallest* hyperphoria I have seen causing headache and discomfort in vision, relieved by prisms, was of 1° in a lady, kindly sent me by Dr. John Thomson of Edinburgh. The hyperphoria was simple and not paretic, was of exactly the same degree on two different examinations, and the refractive correction of each eye was + 0.5 D sph.; + 0.25 D cyl. She complained also of occasional diplopia and frequent threatening of diplopia, and the interesting piece of history was elicited that even when a girl she could never combine the two pictures in a stereoscope, but always saw them partly superposed. It is more than probable that this hyperphoria had existed most of her life, but had only come to give her trouble during the last few months from diminished power of overcoming it. Perhaps this may also explain the case of an old gentleman with right

hyperphoria of 5°, the symptoms of which had only troubled him for the last few months. It is difficult to conceive how such a latent deviation could suddenly develop, as there was no paretic element in it. It is possible that he too may have had it through life without causing him any trouble till the power of overcoming it was reduced. What makes it still more probable that its existence was of long standing is that it caused no headache or asthenopia, but only bewilderment from a want of fixity in vision, and frequent threatening of double vision. Prisms of 4° (2° D.) before each eye removed these symptoms and made objects appear solid and stable.

The persistency of hyperphoria is very remarkable. In a doctor of my acquaintance I noted at two separate times, so far apart as two years, a persistent hyperphoria of exactly 1½°. The headache from which he has suffered for many years is very likely connected with it, but I have not yet prevailed on him to try prisms. He has also 0.5 D. of hypermetropia.

In true hyperphoria, one eye turns up when it is covered as much as the other turns down when it is covered. In Mr. Berry's clinic we have noticed some rare aberrant forms of hyperphoria, in which one eye turns up without the other turning down, or in which either eye turns up when covered. These are, of course, not the cases for prisms.

Prisms to correct hyperphoria should, of course, be equally divided between the two eyes, and should be edge up before the eye that deviates upwards, and edge down before the other eye. A practical point about prisms is that they are tolerated of greater strength when vision is imperfect, as from corneal nebulæ, or in an unobservant patient.

E. EMMERT (Bern). Keratitis Dendritica and Herpes Corneæ Febrilis. *Centralblatt für Augenheilkunde. Dec.*, 1892.

Hagenauer of Zurich, published a dissertation[1] in 1891, in which he sought to prove that certain cases described as differing so far from herpes corneæ as to constitute a distinct disease, are really only instances of herpes, and that ignorance or wilful neglect of the writings of the Zurich School had led to the introduction of a second name for one and the same disease. It is to combat this opinion that Emmert's article is written.

Hagenauer would have us believe that herpes is recognised by the manner in which the corneal epithelium is lost, and that the diagnosis requires the use of fluorescin. He describes sixteen cases which he saw during the influenza epidemic of 1889-90, in all of which the patients were attacked during or after a febrile affection; in no case did he discover any vesicles on the cornea, and from the very first he only saw loss of substance.

From his own observations on the subject, Emmert describes herpes corneæ febrilis as follows. Transparent blebs of fluid form with rapidity (*i.e.*, in the course of a few hours) during the period of fever or immediately after it, these vesicles being as a rule more numerous outside of, than within, the pupillary area. The eruption of these is almost always accompanied by more or less severe stabbing pain, which lasts for a few hours. Soon after a vesicle forms, it bursts and leaves a loss of substance. The process may cease after the formation of one vesicle, which heals when the epithelium has been shed; or in its neighbourhood others may form in the course of a few days, and those which lie near one another then run together, being connected by narrower streaks of superficial ulceration. This process may produce a "dendriform" appearance, and if it extend over a considerable superficial area

[1] "Ueber die Missdeutungen des Herpes Corneæ Febrilis."

of the cornea, the aspect of its surface, when the epithelium has peeled off, may become very different from that present during an earlier stage. Grayish streaks are often to be seen connecting these denuded areas. In the majority of cases the eroded portions have a clear base and margins, but when healing is delayed they are apt to become gray and swollen, with steeper, and somewhat thickened lips; should the part become infected hypopyon and iritis may appear. The duration of healing and of the resulting opacity varies greatly in different cases. These points can all be made out without the use of fluorescin, which, though very useful, is not the necessity which Hagenauer maintains it to be.

"To show that herpes corneæ can be diagnosed in other places besides Zurich," Emmert gives notes of some cases from his own case books of the last two years (eleven in all). Of these, most interesting is that of a girl who suffered from influenza with bronchial catarrh in November, 1889. Following this she had abscesses of the fingers, affecting both soft tissues and bone, pleurisy, and repeated inflammation of the eye. Finally, in the spring of 1892, she acquired fresh febrile symptoms, with numerous spots of infiltration of the lung, of which she expectorated gangrenous particles; she became greatly emaciated and died. In the sputum no tubercle bacilli were ever found—only staphylococcus aureus. Emmert saw her first in October, 1891, on account of a small round patch of epithelial loss in the lower inner quadrant of the cornea of the right eye, apparently the consequence of a herpes vesicle. He regards the corneal process as analogous to that taking place in the fingers. Application of the galvano-cautery was the treatment adopted; hypopyon and iritis developed later, but all healed up in about three weeks, leaving a small nebula. Early in 1892 the epithelium on the scar broke down and came away, but was quickly replaced.

Emmert regards this case as of great importance etiologically; he considers that the general symptoms point to local interruptions to circulation, resulting in small

abscesses (in the fingers, and probably at the end in the brain), and patches of gangrene (lungs)—such vascular disturbances as have been found by various observers in influenza. He believes that these facts point to a similar cause for the original ulcer, and its superficial recurrence at a later date; and expresses the opinion that probably a large number of the cases of herpes during influenza are also due to local obstruction to circulation. In those cases in which the vesicle stage has not been observed, and in which the ulceration has spread deeper, one cannot dogmatically assert that there has been herpes, for we do not know whether some other process might not produce a similar result.

He goes on to enumerate the following points of contrast between herpes corneæ and keratitis dendritica. (1) Keratitis dendritica is a rare disease (at all events in his district), while herpes corneæ is frequent, "even if not quite so frequent as it appears to be in Zurich." Since publishing in 1885 he has seen only two cases of keratitis dendritica, and neither of these occurred during the influenza epidemic. (2) His patients became affected by keratitis dendritica while in the best of health, without fever symptoms, some of them while under treatment for other trifling eye disease; so that it is impossible that he could have missed a vesicular stage, had there been any, or a period of primary loss of epithelium. (3) All patients who suffered from keratitis dendritica were of scrofulous habit. This may, however, be merely an accidental relationship. (4) In his cases of keratitis dendritica the onset was rapid, with great injection of the conjunctiva of the globe, and much swelling of that of the upper lid, without secretion. In herpes corneæ he has never seen these conjunctival symptoms. (5) Keratitis dendritica exhibits its special features so obviously that the use of any colouring fluid, such as fluorescin, is superfluous. (6) Occasionally the disease begins with a patch of subepithelial grayish opacity, from which spring branches of a similar appearance. Thus there is not a confluence of discrete areas, but a lesion growing by continuity.

Over these grayish sub-epithelial "furrows" the thickened epithelium is heaped; this is then thrown off, leaving a furrow exposed.

Comparison of these symptoms with the appearances presented by herpes corneæ, renders unnecessary any further proofs of the existence of two separate substantive diseases; there is a certain resemblance between them in regard to the form of the ulcerated area, but this does not prove that they are identical.

Hagenauer is quoted as concluding his paper by re-asserting that Hansen Grut, Emmert, Hock, Kipp, Macrocki and van Millingen have mistaken for a new disease cases of what Horner described twenty years ago as herpes corneæ, and by recommending the discontinuance of the terms keratitis dendritica, keratitis ramiformis, kératite ulcéreuse en sillons étoilés, and malaria-keratitis, all being classed under the original and correct name of Herpes Corneæ febrilis.

On the other hand, Haltenhoff is cited by Emmert as asserting the independence of Hansen Grut's disease, and ridiculing the notion that an observer so acute as the Copenhagen professor should have for years been mistaking the nature of a malady which he has made a special study.

To Horner, Emmert concludes, we are deeply indebted for the first accurate description of herpes corneæ, but keratitis dendritica is a disease distinct and separate.

W. G. Sym.

J. N. LANGLEY and H. K. ANDERSON. On the Mechanism of Movements of the Iris. *Journal of Physiology*, Vol. xiii., No 6.

This paper is an attempt to settle definitely the question of the dilation of the pupil, which has been the subject of controversy for the last fifty years, and which seems to be as far from settlement as it has ever been. The whole investigation was undertaken with the object of demonstrating the existence of a muscular dilator mechanism; we have here the first instalment containing the experimental evidence, the histological question being kept for later publication.

The authors have thought it advisable to review all the existing theories of importance which have been put forward on the subject; in a large number of cases they have repeated the original experiments, either confirming or disproving them, or supplementing them by others where the result was doubtful. They have added some new experiments and observations of their own, which seem to prove conclusively that there is a dilator mechanism in the iris which acts through stimulation of the sympathetic. Considering the importance of the subject, we think it advisable to give a brief outline of the controversy, and of the position of the question up to the present time before dealing with the new observations.

THEORIES AS TO THE CAUSE OF DILATION OF THE PUPIL.

1. Dilation is due to the action of the sympathetic vasoconstrictor nerves (*a*) by decreasing the quantity of blood in the iris, (*b*) by longitudinal contraction of the radial arteries dragging the sphincter outwards.

2. Dilation is produced by contraction of radially arranged muscular fibres.

3. Dilation is produced by inhibition of the sphincter. This is the theory put forward definitely by Gaskell, which now holds the field; it requires the presence of elastic tissue in the iris.

Active elongation of the sphincter has not been put forward as a cause of dilation, but it would aid it.

4. Dilation might be caused by relaxation of the ciliary muscle, whereby the elasticity of the ciliary region and choroid would drag back the iris.

5. Dilation may result from the simultaneous action of more than one of these causes.

### Alleged Proofs of the Presence of a Dilator Muscle.

1. It was asserted that death of the sphincter took place before that of the dilator, in that stimulation of the eye some time after death caused dilation of the pupil. As a fact the sphincter does not die soon after general death.

2. Constriction or dilation of the pupil varies according to the position of the stimulating electrodes. These experiments have been repeated, and the results have been found variable and therefore untrustworthy.

3. Local dilation of the pupil on local stimulation has been taken as proof of the existence of a dilator muscle, but if a general contraction of the blood vessels could cause general dilation, a local contraction of them could equally cause local dilation of the iris.

4. Dilation after removal of the sphincter: the experiments to demonstrate this have been repeated, but the results obtained were too slight to be at all convincing that wide dilation of the pupil is produced by the contraction of a radial muscle.

### Proofs of the Absence of a Dilator Muscle.

1. The comparative behaviour of the pupillary and ciliary portions of the iris under stimulation by heat and electricity. The result of previous experiments has been to show that the sphincter contracted with warmth, and that the ciliary portion did not. Fresh experiments, however, show that a radial shortening can always be made out in the ciliary portion of the iris, the difference between the two regions being one of degree only.

2. Elongation of the excised sphincter on stimulation.

The tone of the sphincter can be diminished by direct stimulation of the muscle; if it were shown to be due to stimulation of the nerve endings, it would go far to prove that the sympathetic is an inhibitory nerve of the sphincter. But even so, this would not exclude the possibility of its being also the cause of contraction of a radial muscle.

3. A difference has been noted in the latent periods of contraction and dilation, but this appears to depend upon the strength of stimulus used.

4. Analogy. It has been argued, chiefly by Gaskell, on the general functions of the sympathetic system, that the pupillo-dilator fibres are inhibitory. The functions of the sympathetic vary so much in the different organs of the body that analogy does not really help us in determining the function of the supply to any one tissue.

### On the Relation between the Vascular Changes in the Iris and the Size of the Pupil.

1. Turgescence of the blood-vessels of the iris. It was formerly thought that the movements of the pupil were due to variations in the amount of blood in the vessels of the iris; this was disproved by the known facts of engorgement of the head and neck occurring with a dilated pupil, and of the pupil becoming small after decapitation. Further experiments which the authors have made have convinced them that this view has no satisfactory foundation.

2. Contraction of the blood vessels of the iris. From observation of the size of the pupil and the size of the blood vessels of the iris, seen through a microscope, the conclusion is arrived at that the dilation cannot be due to a longitudinal contraction of the blood vessels. There is a great want of synchronism between the movements of the pupil and the changes in calibre of the vessels, the dilation occurring first, and reaching its maximum before the vessels of the iris begin to contract. As to the possible connection between the size of the pupil and the ciliary muscle, it is conceivable that the continuity of the

iris with the choroid might cause a variation in the size of the pupil when the choroid is acted upon by the ciliary muscle, but such action must be very slight, and it is moreover counterbalanced by the synchronous backward or forward movement of the lens. The sympathetic has been again found to have no inhibitory action upon the ciliary muscle.

### Experimental Proofs of the Existence of a Radial Contractile Substance (Dilator Muscle) in the Iris.

(1) *Movement of the iris on the side opposite to a local dilation.*—Whenever a marked local dilation of the iris is produced by local stimulation of the sclerotic or of the cervical sympathetic after removing all the long ciliary nerves but one, the side of the iris opposite to the stimulus is more or less dragged over to the stimulated side. This appearance cannot be accounted for on the theory that the movements of the iris are produced solely by a sphincter capable of inhibition, and by relaxation of radial elastic fibres.

(2) *Local dilation of the pupil with simultaneous local contraction of the sphincter.*—When the cervical sympathetic is stimulated after section of all save one of the long ciliary nerves, the portion of the iris stimulated moves evenly outwards in a purely radial direction; the local dilation of the iris is of the same nature when a weak stimulation is applied to the edge of the sclerotic. But with a stronger stimulation in this region, in addition to the outward radial movement, there is a drawing together of the iris on either side of and towards the most dilated portion—in fact, there is a contraction of the sphincter. This contraction of the sphincter causes a set of closely packed radial folds to form in the anterior surface of the iris, which gives an appearance of fine surface puckering to its inner edge; these folds diverge and curve outwards as they pass to the ciliary region. "The first effect of the

stimulation is usually a slight brief contraction of the pupil; immediately after, or as a continuation of this contraction, the inner edge of the iris opposite the electrodes gathers into fine radial folds or creasings, and the portion of the iris on either side passes towards this region, thus increasing the number of folds. The shifting of the inner border of the iris is further indicated by the curved course taken by the folds. . . . . Whilst the sphincter is still contracted, and before it has attained its fully contracted condition, the local dilation of the pupil begins."

(3) *Contraction of a radial strip of iris.*—A wedge-shaped piece of iris is isolated from the rest by two radial cuts, and left attached by its ciliary edge. Here contraction or relaxation of the sphincter might cause narrowing or widening of the pupillary edge, but could not cause any radial movement of the whole piece of iris. In such a piece of iris, radial shortening can be produced by direct stimulation, by stimulating the sclerotic, and also—and this is more important—by stimulating the cervical sympathetic. The shortening of the strip proceeds until it is half, or less than half, of its previous length. Portions of the pupillary edge of the iris even up to three-fourths of it have been cut away, and shortening of the rest has been obtained on stimulating the sympathetic. By fixing the sphincter edge, local areas or waves of contraction can be produced in the ciliary portion of the iris, and sometimes a wave of contraction passes from the ciliary portion inwards.

(4) *Absence of Elasticity from the Iris.*—The inhibitory theory of the action of the sympathetic pre-supposes the presence of elastic tissue in the iris; in maximal dilation the iris almost disappears under the edge of the sclerotic; if the sphincter of the iris be removed, it not infrequently happens that the retraction of the outer portion is slight; this should not be when all impediment to the relaxation of the elastic tissue is removed. Further, no retraction at all takes place after two or more days, at a time when elastic tissue should still retain its properties.

Finally, by a series of experiments on the sphincter iridis which seem conclusive, the authors show that the sympathetic has no inhibitory power over the sphincter muscle at all.

Taking the results of previous observations, it seems to us that the preponderance of evidence was in favour of the existence of a dilator muscle of some kind, in spite of the accession of strength brought to the other view by the arguments of Gaskell. We welcome these new proofs, which seem to us decisive of the question, as they are on the side of simplicity, and we look forward with interest to the histological question, which is reserved for a later paper.

W. T. Holmes Spicer.

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E. Fuchs (Vienna). Text-book of Ophthalmology. *Authorised Translation from the Second German Edition, by Dr. A. Duane, New York. London: H. K. Lewis*, 1892.

All that seems necessary to recommend the volume before us to students of ophthalmology, is the knowledge that it is a faithful translation of the German edition of Professor Fuchs' monograph. We are glad to give this assurance to our readers; Dr. Duane has *translated*, and has refrained from the too common practice of *editing*, *i.e.*, of altering the original to suit the theories of the translator. The additions by the translator consist of some sixteen footnotes, usually explanatory of the text, and an appendix of seven pages, giving illustrations of instruments used in ophthalmic surgery.

We find much to commend and little to criticise adversely in this volume. The plan of the book follows precisely that of the original treatise, which has been reviewed at some length in this journal (Ophthalmic

Review, 1890, p. 113). The only actual mistake we have noted in reading Dr. Duane's translation is an anatomical one for which Prof. Fuchs is responsible, and which the translator has passed unheeded. In both the German and American editions the ophthalmic artery in the optic canal is said to lie on the *inner* side of the optic nerve, whereas according to anatomists the vessel is "on the outer side of" or "below and to the outer side of" the nerve.

It is perhaps scarcely fair to criticise the very numerous Americanisms in a book adapted for "American readers;" we are, however, unable to see that they in any way add to the attractions of a book, and we venture to think that many of the translator's countrymen would have been equally well pleased if he had been content with ordinary English words and expressions. Certainly his readers in this country would have been more grateful than they are for the work as it stands.

The printing of both letterpress and illustrations is excellent.

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**E. Landolt (Paris). Cataract-Operation in our Time.** *The Ophthalmic Record. Oct. and Nov.*, 1892.

This most interesting paper appeared originally in three consecutive numbers of the *Archives d'Ophtalmologie*. Shortly afterwards it was translated into German and English, and in the latter form appears as a double number of the *Ophthalmic Record*. We shall not attempt to give an abstract of it here, for every ophthalmic surgeon will be interested to read it in its entirety. Our object is to draw the attention of our readers to the journal, in which a full translation by Dr. Culver may be found.

As Landolt points out, the last few years have been

marked by great improvements in the surgical treatment of cataract, mainly through the introduction of cocaine and the development of the principle of asepsis, and the present time is particularly appropriate for a full and critical discussion of the several points on which the opinions of experienced operators are still at variance. In order to obtain the data necessary for a complete discussion of the subject, Landolt issued, some two years ago, a circular letter with a series of questions concerning points of practice and opinion to a large number of experienced ophthalmic surgeons in Europe and America. The inquiries appear to have been freely answered, and the paper before us comprises, therefore, a large number of opinions of high authority.

Taking up one point after another Landolt shows how greatly ophthalmic surgeons are still at variance as to the merits and demerits of different methods, and attempts to establish the principles on which a judgment should be formed. The following are the chief questions discussed: The operability of cataract at different stages of its development, *i.e.*, with regard to maturity and immaturity; the position and size of the incision, and the kind of knife to be employed; the value of an iridectomy; the different methods of opening the capsule; the importance of ensuring a good illumination of the eye during the operation; the toilet of the eye; secondary operations; bandages and dressings; antisepsis and asepsis.

With regard to the burning question of the so-called "simple extraction" *versus* the extraction with iridectomy, Landolt shows no injudicious dogmatism. He holds that for different operators different operations may be respectively the best, and that for a large number of typical senile cataracts either method will give excellent results. He distinctly inclines to the retention of iridectomy as a safeguard in a large number of cases, and upholds the performance of a preliminary iridectomy as giving the maximum of safety. The colleagues who agree in this last opinion, and act upon it, are, he tells us, "more numerous than is generally supposed."

The whole essay is written in the author's well-known lucid and attractive style, and is full of interest for those whom it concerns.

P. S.

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A. ELSCHNIG (Graz). On the Origin of Retinal Rupture in Retinal Detachments. *Klin. Monatsblätter f. Augenheilk, December*, 1892.

In the majority of cases of retinal detachment—it matters not what the cause may have been—rupture in one or more parts of the separated membrane can, by careful ophthalmoscopic examination, be made out. The exact relation of these tears in the retina to the more general detachment has, until recently, provided an ample field for discussion. Some held that they were merely accidental and had nothing to do with the disease itself, others that they had a direct bearing on the origin of the detachment, and might be responsible for its occurrence.

Nordenson, in his excellent work on the retina[1] has gone a long way towards settling the question. He believes that in those cases where detachment takes place *suddenly* the cause is to be looked for in the retinal rents brought about by the dragging action of a shrinking vitreous especially exerted on more or less isolated points of the retina, whereby, of course, fluid transudes behind the structure and pushing it forwards, causes a partial or complete separation. But where the detachment is of *slow* growth, it is due to traction of the shrinking vitreous more widely and evenly distributed than in the former case. There is here, therefore, less liability to retinal rupture than in the more rapidly formed detachments, and as a matter of fact it is less frequently present. It may,

[1] Die Netzhautablösung, Untersuchungen über deren pathologische Anatomie und Pathogenese, von Dr. F. Nordenson, Wiesbaden, 1887.

however, occur, but if so it is secondary, and plays no part in the causation of the disease.

This theory, is now, to a great extent, accepted by the authorities of the day.

But the author has recently had the opportunity of examining two cases of retinal detachment, with rupture in the separated part, in neither of which do the conditions seem to correspond with the view just stated, and which suggest rather a cause for their occurrence that, so far as he knows, has not yet been advanced by anyone.

Van Z. d'A, æt. 22, a student, consulted the writer on November 22nd, 1890, for an injury to his left eye, caused in the fencing school two days previously by a blow from a broken piece of foil which sprang back and struck him on the globe. The eye bled only slightly, but his sight was immediately affected. For some hours before the patient was seen lacrymation and photophobia had been present and the vision was becoming worse.

About 5 mm. from the outer corneal margin there was a small scleral cut, whose edges were swollen and much injected, but which did not, the author says, look like a perforating wound. There was marked iritis, and intense conjunctivitis; the vitreous contained floating opacities; T.n. A complete ophthalmoscopic examination was impossible.

On December 1st, when the acute symptoms had subsided, a more careful investigation revealed the following condition. Numerous streaks of hæmorrhage were present in the vitreous, stretching backwards and inwards from the ciliary region. In the outer periphery of the fundus there was a flat—not floating—retinal detachment, which as well as the retina in its immediate neighbourhood, was injected with blood. Some of the vitreous opacities seemed to be attached to this; no rupture of the retina could be made out. Elsewhere the fundus was normal except in the macular region, where many small yellowish spots of exudation were seen. Field for white normal, but there was a central scotoma absolute for blue-yellow, and relative for green-red. Vision—fixation being excentric—

was $\frac{6}{60}$ with — 2.5 D., and large Jäger type. (The patient is myopic, and has worn glasses, — 2 D., for years.)

The eye remained quiet, but the exudation changes at the macula became gradually more extensive; in addition to the yellow deposits there were now added very minute pigment spots, and the affected area increased. Up till this time, the 24th December, the patient had stayed strictly in a half-darkened room, and had observed all precautions as advised by his doctor, but he now became restive and, refusing to believe in any attending risk, betook himself to the ice, where he spent several hours in skating. During the succeeding night he had a sensation of blinding lights in the left eye, and in the morning the field for white, previously normal, was found to be considerably contracted.

The note of this date is as follows:—Eye quiet. T.n., the retina in upper and outer quadrant detached, moderately folded and floating; no rupture discernible. Close by the macula the retina *in situ* and showing the exudation changes above described more markedly than ever; vitreous fall of diffuse dust-like opacities. V. $< \frac{3}{60}$ — excentric.

The next note is on February 15th, after an interval of six weeks, during the whole of which the patient had been lying on his back with his eyes bandaged, a course of treatment that effected absolutely no improvement.

The complete outer half of the retina is now detached, but at the macular region the separation is flatter than elsewhere; in this flat portion at a point corresponding to the macula is an oval opening in the floating retina through which the choroidal vessels and pigment epithelium can be plainly made out. The long axis of this aperture is placed horizontally, and measures about one disc diameter. The vitreous is now almost clear. The separated retina is still sensitive to light, so that the field for white remains comparatively normal. Absolute central scotoma for colours and entire loss of colour perception also in the half of the field which corresponds to the detachment.

Elschnig interprets the case shortly as follows: In an eye perfectly healthy—the slight myopia present does not amount to an abnormality—an injury causing retinal and vitreous hæmorrhage has produced a circumscribed retinal detachment at that portion of the fundus, viz., close to the ora serrata, which corresponds to the seat of the wound. This is followed by plastic iritis, and retino-choroiditis, particularly in the neighbourhood of the macula lutea. Three weeks later, when all iritic inflammation had subsided, the detachment suddenly increased immediately after violent exercise on the part of the patient. As yet, however, it had not involved the macula. This is probably due to the more than usually intimate adhesion between retina and choroid produced in this region by the inflammatory processes of which it has been the seat, and which has enabled the two structures to adhere together, when otherwise they might have been pulled apart. But with the gradual extension of the separative process, the movements of the floating membrane, and perhaps of the fluid behind it have eventually torn the retina from the choroid, leaving only that small portion of the former, which, by virtue of the preceding inflammation has become too firmly fixed to be moved. Hence the oval opening.

By the time that accurate ophthalmoscopic examination had become possible, the detached retina had sunk somewhat downwards, so that the position of the opening in it was not in line with that part of the choroid to which it had previously corresponded, but with a point below it. It was therefore impossible to determine whether there was or was not a portion of retina still in normal position round about the macula, but the author thinks that his failure to detect in the vitreous any piece of retina which might have represented the defect is, *pro tanto*, evidence of the correctness of his view.

The theory is ingenious as well as interesting, but we must confess that it seems to us to need very ample substantiation before it can lay claim to be adopted.

A very few words will suffice for the description of the second case. It is that of a healthy woman, aet. 54,

whose left eye had for some time shown signs of failing. Examination detected posterior synechiæ in the iris; numerous dust-like and a few roundish opacities in the vitreous, and a large detachment of the retina in its lower half. At the periphery of the fundus below there was an irregularly square-shaped defect in the detached retina, through which, as in the former case, choroidal pigment could be seen as well as distinct evidence of choroidal inflammation. Two delicate threads crossed the opening—probably obliterated retinal blood-vessels—and the vessels round the aperture were larger and more numerous than elsewhere. The edges of the opening are for the most part smooth and sharply defined, but here and there are rolled outwards towards the choroid.

A similar explanation to that already suggested may account for this condition. The two obliterated retinal vessels which bridge over the opening might not impossibly have been torn from the subjacent adherent retina, in which they originally lay; but this explanation of their presence does not seem an entirely satisfactory one, and is hardly calculated to confirm the waverer in his belief in Dr. Elschnig's theory.

N. M. ML.

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## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JANUARY 26TH, 1893.

HENRY POWER, M.B., F.R.C.S., President, in the Chair.

*Remarks on Peculiar Foreign Bodies on the Cornea.*—Mr. Doyne drew attention to small flattened particles not infrequently found firmly adherent to the surface of the cornea, near its margin, and which are usually thought to be small fragments of bark or husks of seeds. He had

been struck by their close resemblance to the scale insect well known to gardeners; this insect is limpet shaped, and has a sucker by which it fixes itself to the stalks of plants. Mr. Doyne showed specimens of the insect on plants, and asked members of the Society to examine foreign bodies of this kind which they might meet with, to obtain evidence confirmatory or otherwise of his suggestion that they were the scale insect.

*Simple Photophobia treated by the Continuous Current.*—Dr. John Hern (Darlington) read a paper describing cases in which the chief symptom was photophobia, without discoverable lesion by naked eye or ophthalmoscopic examination. The patients were usually anæmic, of nervous temperament, and in several instances were convalescing from a severe illness. They did not exhibit ordinary hysterical symptoms. He thought the photophobia was due to retinal change, the exact nature of which was undetermined. The treatment he advocated was the application of the continuous electric current applied in the way described by Buzzard.[1]

Mr. Stephenson inquired as to the condition of the fields of vision and colour vision in these cases.

Dr. Ormerod suggested that with a view to determine whether or no the condition were hysterical, some cases should be treated in a precisely similar way, but without any current turned on from the battery.

Mr. Juler asked if Dr. Hern had applied fluorescin, to determine that no corneal ulcer existed.

In reply, Dr. Hern said that of thirteen cases, the colour vision and fields of vision were, as far as ascertainable, normal in ten. He had tried treatment by "suggestion," but without effect. Many of his cases occurred in rheumatic people.

*Concerning Persistent Pupillary Membrane and its Frequency.*—Mr. Sydney Stephenson read a paper on persistent pupillary membrane, and showed illustrations of the

[1] *Trans. Oph. Soc.*, vol. ix., p. 191.

different varieties of that condition. He had found pupillary vestiges sixty-eight times among 3,414 eyes. The percentage among 1,994 males was 1.81, and among 1,420 females, 2.25. In thirteen of the sixty-eight cases, the vestiges were present in both eyes, in the remainder, only one eye was affected. Of the monocular cases, the right eye was the seat of the anomaly in twenty-five instances, and the left eye in seventeen. In no case did the pupillary vestiges interfere either with sight or with the action of the pupil. Mr. Stephenson drew attention to the differences between remnants of pupillary membrane, and of capsulo-pupillary membrane. In the former the strands stretch from one point to another in the small circle of the iris; in the latter, the threads arising from the small circle of the iris are inserted into the anterior lens capsule. He had only met with one instance of capsulo-pupillary membrane among his total number. Pupillary membrane, or rather, vestiges of it, may not infrequently be found in several members of the same family, and the condition is fairly often associated with other congenital anomalies of the eyes. Mr. Stephenson found no evidence in support of the statement sometimes made, that remains of pupillary membrane are likely to disappear during the earlier years of life. In 152 eyes of children three years old the percentage was 2.6, while in 270 eyes of children eight years old, the percentage was 3.33.

Dr. Argyll Robertson referred to a case of capsulo-pupillary membrane recently under his observation, in which the opacity on the anterior lens capsule was pigmented, and so dense as to materially interfere with sight. The defect in the worse eye was sufficient to call for operative treatment, and by needling and removal of the lens, good vision was obtained.

Mr. Eales (Birmingham) spoke of the want of elasticity the persistent pupillary filaments exhibited. With a dilated pupil they were tense, but with a contracted pupil they were often loose and wavy.

*Living and Card Specimens.*—Mr. Beaumont: Congenital Ectopia Pupillæ.—Mr. S. Stephenson: Set of Stroschein's

Drop Bottles.—Mr. Hartridge: Drawing of Leucocythæmic Retinitis.—Mr. Doyne: Cyst of Lower Eyelid.—Mr. J. Hern: Epilepsy Treated by Correction of Hypermetropia.—Dr. Hartley: Case of Glaucoma.

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## AMERICAN OPHTHALMOLOGICAL SOCIETY.

Twenty-eighth Annual Meeting, held at New London, 1892.

Dr. Geo. C. Harlan, Vice-President, in the chair.

(*Continued from p.* 36.)

*Tenotomies of Recti Muscles for Insufficiencies.*—Dr. O. D. Pomeroy, of New York, reported fourteen cases. Cases of muscular insufficiency requiring such treatment were exceptional, most of the cases he had met with being relieved by correcting the accompanying ametropia. In dividing the tendon a little over-effect is usually desirable, and if considerable over-effect is obtained, a suture corrects it. In many cases the patients have had diplopia when looking toward the divided tendon, but this has been temporary and unimportant.

*Intra-cranial Lesions with Defects of the Visual Fields.*—Dr. Chas. Stedman Bull reported five cases with autopsies. 1. A woman aged 50, after severe mental shock causing convulsions, had profound nervous prostration, and severe neuralgia for a year, then night blindness in one eye with progressive amblyopia, and a year later the other eye was affected in the same way. When seen three years after this, there was large irregular central scotoma in the left eye for form and colour, and a smaller scotoma in the right. The fundus of the right eye was little affected. The left showed neuro-retinitis in the stage of decline, and beginning atrophy of the optic nerve. The autopsy

showed extensive pachymeningitis of the convexity of the left anterior lobe, some patches over the right anterior and parietal lobes; and all the arteries at the base of the brain were thickened and their lumen narrowed.

2. A man aged 24, with headache for over a year, muscular twitchings in the upper extremities and face, and attacks of vertigo for six months, showed concentric narrowing of the field in both eyes which steadily increased, and vision slowly failed. The optic discs, at first hyperæmic, became pale and atrophied. The autopsy revealed a large tumour (a small-cell sarcoma) involving the optic chiasma and both optic nerves.

3. A man, aged 37, had suffered from severe headaches for nine months, loss of vision in the right half of each field for seven months, and loss of the sense of smell for six weeks. Examination showed vision 20/50 in each eye, bilateral right hemianopsia, and concentric limitation of the remaining fields. At the autopsy, five months later, an olive-shaped tumour (small-cell sarcoma) was found in the left cuneus, close to the median line.

4. A woman aged 72, with severe headache for more than a year, six months before coming under observation awoke with severe pain in the head, and total blindness in the right eye. She presented slight bilateral ptosis, vision 20/60; slight lenticular opacities, and bilateral left hemianopsia. Fundus examination negative. Twenty months later she died. The autopsy showed a patch of softening in the left anterior lobe; the branch of the middle cerebral artery running through it being closed by an old plug, and completely obliterated. There had been recent rupture of another branch of the same artery, and formation of a large clot in the middle lobe. All the arteries of the brain were diseased, and at the base, overlying and pressing upon the right optic tract, was a small-cell sarcoma the size of a hazel-nut.

5. A man, aged 35, had severe headache for three years, and occasional attacks of nausea and vertigo, and diplopia for nine months. There was paresis of both external recti. Vision was R. = 20/100, L. = 20/50. There was marked

papillitis with numerous hæmorrhages, homonymous diplopia for all distances, irregular central scotoma for all distances, irregular central scotoma for all colours, and vertigo, with a marked tendency to rotate to the right side. The autopsy revealed a globular tumour in the right lobe of the cerebellum close to the peduncle. It was a glio-sarcoma.

*Monocular Amblyopia in Members of the same Family.*—Dr. Kollock, of Charleston, reported the cases of two brothers and two sisters, all amblyopic in their left eyes. One had disseminated choroiditis in both eyes, another had coloboma of the left optic nerve, and the others had hyperopia of three or four dioptres in both eyes, without any abnormality of the fundus.

*Posterior Capsular Opacities.*—Dr. W. F. Mittendorf, of New York, called attention to the frequency of small round opacities marking the attachment of the fœtal hyaline artery to the posterior lens capsule. Among 1,884 persons, examination with a strong lens and the ophthalmoscope revealed them in forty-four cases. Their location is almost invariably a little to the inner side of the posterior pole of the lens. He had observed such opacities more frequently in males than females, and more frequently in the right eye than the left, but deemed these differences accidental.

*Orbital Cellulitis.*—Dr. E. E. Holt, of Portland, reported a case occurring in a deaf mute, male, aged 20, following probable bruise of the orbit. There was great swelling of the lids extending to the temporal region and neck, constant high temperature, and complete unconsciousness. Incision on the fourth day was followed by subnormal temperature. Subsequently the temperature rose again, meningitis ensued, and was followed by death. This disease had been met with five times among twelve thousand patients.

*Tenonitis.*—Dr. Charles J. Kipp, of Newark, reported a case of recurrent bilateral inflammation of the capsule of Tenon, in connection with mercurial poisoning. During the

attack the eye became prominent and immovable, and as it recovered the other eye became similarly affected. Then as the second eye recovered the first was again attacked. This continued for several weeks, when under the use of potassium iodide he greatly improved. At the end of three months he resumed his work at exhausting incandescent electric lamps by means of mercury, but other attacks soon compelled him to give up this work, and since that time—a year and a half—he has been free from any such trouble. Several cases of mercurial poisoning had occurred among the workmen similarly employed.

*Subconjunctival application of Cocaine.*—Dr. Koller called attention to the superficial character of the anæsthesia secured by the instillation of cocaine, which detracted from its value as a local anæsthetic. For operations like tenotomy and advancement, he secures superficial anæsthesia by instillation of a 4 per cent. solution, and then injects beneath the conjunctiva a few drops of a 1 per cent. or 2 per cent. solution. The solution may be rendered aseptic by boiling. The method is also applicable to cataract extraction and similar operations.

*Form of Images in Astigmatic Eyes.*—Dr. Koller read a paper on this subject, showing that the common impression as to the distortion of retinal images in such eyes was incorrect. The images are indistinct, but not distorted. The use of correcting lenses does, however, cause considerable distortion.

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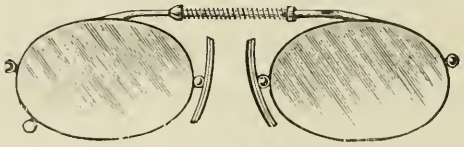

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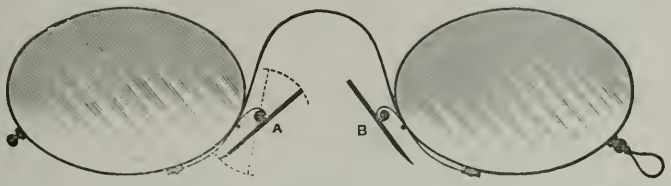
THE

# "SPECTALETTE"

(Patent.)

## AN EYEGLASS POSSESSING ALL THE ADVANTAGES OF SPECTACLES.

The Spectalette (simplified spectacles) is really a pair of spectacles, but without arms. The bridge being immovable the lenses not only remain horizontal, but the *distance between centres is fixed*. When once a frame of proper width is given, central vision is assured. By an ingenious arrangement, using one hand only, the Spectalette slides on to the nose, sits perfectly horizontal, and neither wobbles nor pinches. *See explanation below.*




The plaquets A and B are attached to springs, which latter are pushed back by the nose when drawn on. Plaquet A swivels freely as shown by the dotted lines, but plaquet B is fixed at a certain angle and plays an important part. Its inclination must be adjusted to the same angle as THAT side of the wearer's nose. When this is done to suit the wearer, this fixed—and now adjusted—plaquet keeps the Spectalette perfectly horizontal. The free plaquet A adjusts ITSELF to the other side of nose and thus a perfect fit is obtained.

**THE SPECTALETTE IS OBTAINABLE FROM ALL GOOD OPTICIANS.**

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SHOT

PROOF

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